The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A method for monitoring the transfer of a foreign gene throughout a population of cells, comprising the following steps:

(a) selecting a foreign gene which has been isolated from a cell or virus and which has been transferred into the population of cells;

(b) selecting a labelled compound which will interact selectively with a protein expressed by the foreign gene to produce a labelled product and which has a rate of expulsion from the cells which is greater than a rate of expulsion from the cells of the labelled product;

(c) administering to the cells an effective dose of the labelled compound such that the labelled compound selectively interacts with the protein to produce the labelled product;

(d) waiting a period of time such that a substantial amount of the labelled compound has been expelled from the cells and such that a detectable amount of the labelled product remains within the cells; and

(e) determining the extent and location of the protein throughout the population of cells by detecting the labelled product.

2. The method as claimed in claim 1, further comprising the steps of isolating the selected foreign gene from a cell or virus and transferring the isolated foreign gene into the population of cells.

3. The method as claimed in claim 1, wherein the protein expressed by the foreign gene is not naturally occurring within the cells.

4. The method as claimed in claim 1, wherein step (d) is comprised of non-invasively detecting the labelled product.

5. The method as claimed in claim 4, wherein the labelled compound is a radiolabelled compound which interacts with the protein expressed by the foreign gene to produce a radiolabelled product which can be detected using nuclear medicine imaging techniques.

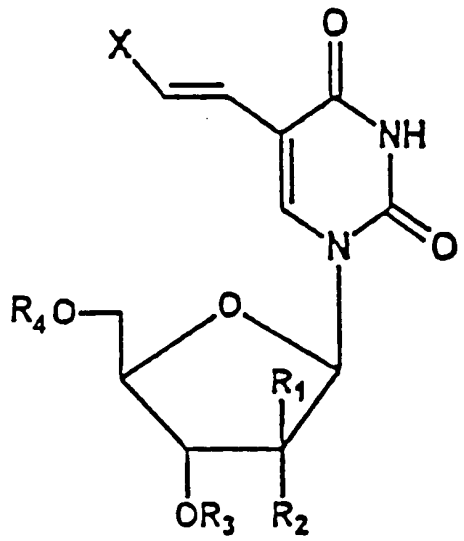
6. The method as claimed in claim 5, wherein the foreign gene is a gene selected from eucaryotic or procaryotic cells.

7. The method as claimed in Claim 5, wherein the foreign gene is selected from a virus.

8. The method as claimed in claim 7, wherein the foreign gene is selected from the group of viruses consisting of herpes simplex virus, human cytomegalovirus, varicella zoster virus and Epstein-Barr virus.

9. The method as claimed in claim 8, wherein the foreign gene is a gene which expresses herpes simplex virus thymidine kinase.

10. The method as claimed in claim 9, wherein the radiolabelled compound is a compound of the formula:



or a pharmaceutically acceptable salt thereof, wherein X is a radioactive halogeno substituent, wherein R_1 is a hydrogen, hydroxyl or fluoro substituent, wherein R_2 is a hydrogen or fluoro substituent, wherein R_3 is a substituent selected from the group consisting of hydrogen, arylcarbonyl, heteroarylcarbonyl, heterocyclocarbonyl, 1-methyl-1,4-dihydropyridyl-3-carbonyl, 3-7C cycloalkylcarbonyl, and alkylcarbonyls with a straight or branched chain having from 1 to 8 carbon atoms, and wherein R_4 is a substituent selected from the group consisting of hydrogen, arylcarbonyl, heteroarylcarbonyl, heterocyclocarbonyl, 1-methyl-1,4-dihydropyridyl-3-carbonyl, 3-7C cycloalkylcarbonyl, and alkylcarbonyls with a straight or branched chain having from 1 to 8 carbon atoms.

11. The method as claimed in claim 10, wherein X is a radioactive halogeno substituent selected from the group consisting of ^{123}I, ^{124}I, ^{131}I, ^{75}Br, ^{76}Br and ^{18}F.

12. The method as claimed in claim 11, wherein X is ^{123}I.

13. The method as claimed in claim 10, wherein X is a radioactive halogeno substituent selected from the group consisting of ^{123}I, ^{124}I and ^{131}I.

14. The method as claimed in claim 13, wherein R_1 is hydrogen, wherein R_2 is hydrogen, wherein R_3 is hydrogen, and wherein R_4 is hydrogen.

15. The method as claimed in claim 14, wherein X is ^{123}I.

16. The method as claimed in claim 13, wherein R_1 is hydrogen, wherein R_2 is hydrogen, wherein R_3 is 1-methyl-1,4-dihydropyridyl-3-carbonyl, and wherein R_4 is hydrogen.

17. The method as claimed in claim 16, wherein X is ^{123}I.

18. The method as claimed in claim 13, wherein R_1 is hydrogen, wherein R_2 is fluorine, wherein R_3 is hydrogen, and wherein R_4 is hydrogen.

19. The method as claimed in claim 18, wherein X is ^{123}I.

20. The method as claimed in claim 13, wherein R_1 is hydrogen, wherein R_2 is fluorine, wherein R_3 is 1-methyl-1,4-dihydropyridyl-3-carbonyl, and wherein R_4 is hydrogen.

21. The method as claimed in claim 20, wherein X is ^{123}I.

22. The method as claimed in claim 13, wherein R_1 is fluorine, wherein R_2 is hydrogen, wherein R_3 is hydrogen, and wherein R_4 is hydrogen.

23. The method as claimed in claim 22, wherein X is ^{123}I.

24. The method as claimed in claim 13, wherein R_1 is fluorine, wherein R_2 is hydrogen, wherein R_3 is 1-methyl-1,4-dihydropyridyl-3-carbonyl, and wherein R_4 is hydrogen.

25. The method as claimed in claim 24, wherein X is ^{123}I.

26. The method as claimed in claim 13, wherein R_1 is hydroxyl, wherein R_2 is hydrogen, wherein R_3 is hydrogen, and wherein R_4 is hydrogen.

27. The method as claimed in claim 26, wherein X is ^{123}I.

28. The method as claimed in claim 13, wherein R_1 is hydroxyl, wherein R_2 is hydrogen, wherein R_3 is 1-methyl-1,4-dihydropyridyl-3-carbonyl, and wherein R_4 is hydrogen.

29. The method as claimed in claim 28, wherein X is ^{123}I.

30. The method as claimed in claim 10, wherein at least one of R_3 and R_4 is hydrogen.

31. The method as clamed in claim 10, wherein R_4 is hydrogen.

32. A use of a labelled compound to monitor the transfer of a foreign gene throughout a population of cells, by selecting a foreign gene which has been isolated from a cell or virus and which has been transferred into the population of cells, selecting a labelled compound which will interact selectively with a protein expressed by the foreign gene to produce a labelled product and which has a rate of expulsion from the cells which is greater than a rate of expulsion from the cells of the labelled product, administering to the cells an effective dose of the labelled compound such that the labelled compound selectively interacts with the protein to produce the labelled product, waiting a period of time such that a substantial amount of the labelled compound has been expelled from the cells and such that a detectable amount of the labelled

product remains within the cells, and determining the extent and location of the protein throughout the population of cells by detecting the labelled product.